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# Rapid DNA Testing and Virginia's Rape Kit Backlog: A Double-Edged Sword Masquerading as a Miracle, or the Future of Forensic Analysis?

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# COMMENTS

## RAPID DNA TESTING AND VIRGINIA'S RAPE KIT BACKLOG: A DOUBLE-EDGED SWORD MASQUERADING AS A MIRACLE, OR THE FUTURE OF FORENSIC ANALYSIS?

### INTRODUCTION

When authorities in Richland County, South Carolina, arrived on the scene after receiving a report of shots fired on July 29, 2014, they found a wounded man but no suspect.[1] The victim seemed to have been on the receiving end of an armed robbery gone wrong and had been shot during a "physical altercation" with the would-be thief.[2] Because of this "physical altercation," officers from the sheriff's department were able to recover deoxyribonucleic acid ("DNA") samples from the victim's clothing.[3] A short time later, suspect Brandon Berry was taken into custody after being apprehended at a traffic stop; Berry would go on to be convicted of, among other charges, attempted murder and attempted armed robbery.[4]

Nothing about this case sounds out of the ordinary—merely a standard armed robbery with a violent twist that ultimately ended in conviction. However, even a cursory reading of local news coverage will reveal that this rapid turnaround from commission of the crime to apprehension of Berry was anything but ordinary.[5] No

1. *Sheriff: RCSD First in Nation to Use RapidHit DNA to Put Criminal Behind Bars*, STATE (Dec. 9, 2015, 1:46 PM), http://www.thestate.com/news/local/article48816510.html [hereinafter *RCSD First in Nation*].

2. *Id.*

3. *See id.*

4. *Id.*; *see* State v. Berry, No. 2017-UP-380, 2017 S.C. App. LEXIS 405, at *1 (Ct. App. Oct. 18, 2017).

5. *See, e.g.*, *RCSD First in Nation*, *supra* note 1; *see also RCSD Captures Suspect with New Identification System*, WACHFOX57 (Aug. 6, 2014, 20:52:29 GMT), http://wach.com/

mention is made of witness identification, spontaneous admissions of guilt, or any other techniques that would normally explain the relative ease and speed with which Berry was apprehended after fleeing the scene. As reported in an announcement made by the IntegenX Corporation, the self-styled "market leader of Rapid DNA technology for human identification in forensics and law enforcement applications," Berry's arrest and conviction marked the first time that Rapid DNA technology was used to obtain a criminal conviction in the United States.[6]

Since the late 1980s, traditional DNA testing has been instrumental to both the conviction of the guilty and the exoneration of the wrongfully convicted.[7] However, "[d]espite the fact that DNA stands among the most unique of individual identifiers, lengthy processing times and high costs have often made it a second choice for generating investigative leads in a criminal case . . . ."[8] Traditional DNA test results can take anywhere from weeks to months, but Rapid DNA testing, which has been in use in the United States since 2011, allows for testing and results within ninety minutes.[9] Using the DNA samples recovered from the victim's clothing, the Richland County Sheriff's Department was able to identify Berry as the perpetrator within two hours.[10]

While Rapid DNA technology has the potential to revolutionize every aspect of the criminal justice system, from arrest to the post-conviction appeals process, there has been particular excitement centered around its potential to reduce the rape kit backlog.[11] Lack

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news/local/rcsd-captures-suspect-with-new-identification-system; Chad Mills, *New DNA Machine Yields Conviction for Richland Co. Sheriff*, 10WISTV.COM (Dec. 9, 2015, 11:21 PM EST), http://www.wistv.com/story/30711558/new-dna-machine-yields-conviction-for-richland-co-sheriff.

6. *About Us*, INTEGENX, https://integenx.com/about-us/ (last visited Mar. 28, 2018); *see Rapid DNA Utilized in Court to Obtain a Conviction for the First Time,* BUS. WIRE (Dec. 10, 2015, 1:02 PM), http://www.businesswire.com/news/home/20151210006216/en/Rapid-DNA-Data-Utilized-Court-Obtain-Conviction.

7. Erin R. Steward, *Discussion and Evaluation: The Legality and Use of Rapid DNA Technologies*, 84 UMKC L. REV. 1133, 1135 (2016).

8. Ava Kofman, *The Troubling Rise of Rapid DNA Testing*, NEW REPUBLIC (Feb. 24, 2016), https://newrepublic.com/article/130443/troubling-rise-rapid-dna-testing.

9. Steward, *supra* note 7, at 1134, 1142. "[T]he term 'Rapid DNA' refers specifically to the faster DNA processing, while the 'RapidHit 200' is the actual technology most commonly used to test DNA in this speedy manner." *Id.* at 1134 n.12.

10. *RCSD First in Nation*, *supra* note 1.

11. *See* Seth Augenstein, *Rapid DNA Act Signed into Law, Setting Target of 90 Minute CODIS Profiles*, FORENSIC MAG. (Aug. 22, 2017, 12:52 PM), https://www.forensicmag.com/article/2017/08/rapid-dna-act-signed-law-setting-target-90-minute-codis-profiles.

of funding, understaffed state crime labs, and local law enforcement discretion over whether to test have led to a national crisis and tens of thousands of untested rape kits, or physical evidence recovery kits ("PERKs").[12] According to the Commonwealth of Virginia Department of Forensic Science, in 2015, Virginia alone reported a backlog of 2902 PERKs that were collected and inventoried by law enforcement but never underwent DNA testing.[13] There has since been considerable progress in Virginia thanks to both legislative pressure and a mixture of private and public funding, but Rapid DNA technology likely has the potential to further alleviate this burden, as well as ensure that future PERKs could be tested early rather than being relegated to the backlog.[14]

Despite the warm embrace that Rapid DNA technology has received from the field of criminal justice, questions remain regarding its scientific integrity, ethical standing in relation to privacy concerns, and admissibility under state evidentiary standards.[15] This comment will explore the future of Rapid DNA technology usage in Virginia courts and track the trajectory of this technology in the criminal justice system. Ultimately, while this technology has tremendous potential, the law has a lot of catching up to do to ensure that it is used fairly and accurately. Using a multi-disciplinary scientific and legal framework, this comment will critically examine the rape kit backlog in Virginia and analyze how this emerging technology could be both helpful and harmful. Part I of this article will address the scientific evolution of the technology

12. *See* Solomon Moore, *Study Calls for Oversight of Forensics in Crime Labs*, N.Y. TIMES (Feb. 18, 2009), http://www.nytimes.com/2009/02/19/us/19forensics.html; Rachel Weiner, *Why Rape Kits Go Untested in Virginia*, WASH. POST (July 6, 2015), https://www.washingtonpost.com/local/virginia-politics/why-rape-kits-go-untested-in-virginia/2015/07/06/a6863432-23e9-11e5-b72c-2b7d516e1e0e_story.html; *see, e.g.*, *Virginia Deserves Applause for Its Work to Eliminate a Rape Kit Backlog*, WASH. POST (June 19, 2017), https://www.washingtonpost.com/opinions/virginia-deserves-applause-for-its-work-to-eliminate-a-rape-kit-backlog/2017/06/19/f7c41066-50fc-11e7-b064-828ba60fbb98_story.html.

13. COMMONWEALTH OF VA. DEP'T OF FORENSIC SCI., PHYSICAL EVIDENCE RECOVERY KIT INVENTORY REPORT, S. 2014-13, Reg. Sess., at 4 (2015).

14. Jenna Portnoy, *McAuliffe Signs Bill Mandating New Rules on Testing Rape Kits*, WASH. POST (Apr. 14, 2016), https://www.washingtonpost.com/local/virginia-politics/mcauliffe-signs-bill-mandating-new-rules-for-rape-kits-in-va/2016/04/14/0c0f816c-01b8-11e6-9203-7b8670959b88_story.html.

15. *See generally* Jessica G. Cino, *Tacking Technical Debt: Managing Advances in DNA Technology That Outpace the Evolution of Law*, 54 AM. CRIM. L. REV. 373, 418 (2017) (discussing evidentiary problems of Rapid DNA technology); Augenstein, *supra* note 11 (discussing Rapid DNA technology's effectiveness in streamlining criminal justice and its need to fit a legal framework and meet scientific standards); Steward, *supra* note 7, at 1148–49 (discussing privacy concerns of Rapid DNA technology).

and past and present techniques used in forensic DNA analysis. Additionally, it will trace the recent trajectory of legislation centered around clearing the rape kit backlog in Virginia, as well as national legislation related to the adoption of Rapid DNA technology in the field of criminal justice. Part II will analyze the national and Virginia standards used to admit forensic DNA evidence at trial, and how Rapid DNA might fit into this framework. Part III will examine some of the potential ethical and scientific issues with the adoption of this new testing technique. Finally, this comment will attempt to predict how Virginia, and the nation as a whole, will balance the undeniable advantages of this new technology with its scientific and ethical challenges. It will also make recommendations regarding best practices, assuming the eventual rollout and adoption of Rapid DNA analysis.

## I. DNA DIAGNOSTIC TECHNOLOGY AND TESTS

### A. *An Explanation and History of Traditional Forensic DNA Testing*

For all of its seeming complexity and confusing vocabulary, the field of forensic DNA analysis "is simply a comparison technique that addresses the question of attribution—can two things . . . be excluded as originating from the same source?"[16] As humans, every single one of our cells contains DNA and, for the most part, our DNA is identical to that of every other human being.[17] However, at specific locations along our chromosomes—"loci"—individuals exhibit minor genetic differences, and these specific and unique differences are what forensic analysts compare to make DNA-based identifications.[18] Each of our chromosomes is made up of two paired strands of DNA, which together look like a twisted ladder.[19] The rungs of this DNA ladder are referred to as "bases," and, of the four possible bases found in human beings (namely, adenine, guanine, cytosine, and thymine), each matches up predictably with its neighboring bases.[20]

16. Cecilia Hageman, *Forensic Biology and DNA, in* THE LAWYER'S GUIDE TO THE FORENSIC SCIENCES 381, 381 (Caitlin Pakosh ed., 2016).

17. *Id.* at 382.

18. *Id.* The singular of "loci" is "locus." *Id.*

19. ERIN E. MURPHY, INSIDE THE CELL: THE DARK SIDE OF FORENSIC DNA 5 (2015).

20. *See id.*; *see also* Hageman, *supra* note 16, at 384.

At each locus, a person can differ from those around them in one of two distinct ways.[21] The first variation, a sequence variation or single nucleotide polymorphism ("SNP"), occurs when a single base found at a locus is different in one person than it is in another.[22] The second type of variation possible at a given locus is a length variation, which occurs when a short sequence of bases is repeated over and over again but the number of times it repeats is different than that of a reference sample.[23] This short tandem repeat ("STR") takes up space in the DNA; therefore, a difference in the number of times it repeats will necessarily make one strand of DNA longer or shorter than a strand with a different number of that particular STR.[24]

The earliest forensic DNA technique was utilized in the United Kingdom in the mid-1980s, and it relied on the comparison of a specific type of sequence variation known as a restriction fragment length polymorphism ("RFLP").[25] Today, most forensics labs have shifted from a reliance on sequence variation comparison—like the RFLP technique—to methods that instead look at length variations—known as STR analysis.[26] To perform a traditional STR forensic analysis, the DNA in a blood, semen, saliva, or other biological sample is first isolated and extracted from any neighboring contaminants.[27] Next, a sample is quantified to determine whether sufficient DNA, if any, exists in order to perform the necessary analysis.[28] The next step, amplification, is in many ways the most important and "is where the process zeroes in on the genetic STR addresses of interest and ignores all the other DNA sequences of a sample."[29] During amplification, the sample is mixed in with "primers," short DNA sequences that are complements of the STR regions of interest, which bind to those specific loci being compared and enable just those regions (not the entire chromosome) to be replicated.[30] Finally, the sizes of the amplified loci are measured

21. Hageman, *supra* note 16, at 387.

22. *Id.* ("For example, a small stretch of DNA at a SNP address might take two forms, Allele 1: AAATTAATT**G**AAATAC and Allele 2: AAATTAATT**C**AAATAC. A human could carry two allele 1s, two allele 2s, or one of each.").

23. *Id*.

24. *Id*.

25. *Id*. at 382.

26. *Id*.

27. *Id*. at 388–90.

28. *Id*. at 390.

29. *Id*. at 391.

30. *See id*. at 392.

and compared to either an individual known sample or a databank of known samples.[31]

Since DNA analysis is the process of comparing an unknown sample to known samples, the loci amplified in STR are chosen very selectively.[32] For the purposes of forensic analysis, the loci chosen will generally correlate with those selected for the Combined DNA Index System ("CODIS").[33] Since its creation in the early 1990s, CODIS has served as a DNA profile repository for federal, state, and local laboratories, and the Federal Bureau of Investigation ("FBI") has used it to maintain quality and ethical standards for the industry.[34] As of 2017, there are twenty "CODIS Core Loci," so forensic DNA labs that wish to compare their samples to the massive CODIS databank specifically amplify their samples at these particular core loci.[35] Once a DNA sample has been processed and compared to the known samples in CODIS, it is the job of forensic biologists to determine whether a suspect can or cannot be excluded from consideration as a potential match.[36]

Despite the common understanding of DNA being used to definitively conclude that a suspected perpetrator is a "match" with DNA previously obtained from convicted offenders, in reality DNA can only be used to (a) rule someone out, or (b) determine that an experimental sample and a reference sample "cannot be excluded as originating from the same source."[37] A match could mean that the DNA tested belongs to the individual logged in CODIS; however, there is also a statistical chance that this match is simply due to two individuals coincidentally sharing the same DNA sequence at these twenty loci.[38] A forensic biologist, therefore, can never say with complete certainty that a sample belongs to a known individual, but can only provide the probability that the two samples come from two distinct individuals who coincidentally happen to share

31. MURPHY, *supra* note 19, at 13.

32. NAT'L INST. OF JUSTICE, SPECIAL REPORT: USING DNA TO SOLVE COLD CASES (2002), https://www.irs.gov/pub/irs-pdf/f4506.pdf.

33. Hageman, *supra* note 16, at 392–93.

34. *Combined DNA Index System (CODIS)*, FED. BUREAU OF INVESTIGATION, https://www.fbi.gov/services/laboratory/biometric-analysis/codis (last visited Mar. 28, 2018).

35. *See id.*; *see also Frequently Asked Questions on CODIS and NDIS*, FED. BUREAU OF INVESTIGATION, https://www.fbi.gov/services/laboratory/biometric-analysis/codis/codis-and-ndis-fact-sheet (last visted Mar. 28, 2018) [hereinafter *FAQs on CODIS and NDIS*].

36. *See* Hageman, *supra* note 16, at 399.

37. *Id.*; *see FAQs on CODIS and NDIS*, *supra* note 35.

38. Hageman, *supra* note 16, at 399–400.

identical DNA sequences at these loci, or the random match probability ("RMP").[39]

### B. *A New Generation of DNA Testing: The Rapid DNA Revolution*

Since the first American use of forensic DNA to obtain a criminal conviction in 1988 in *Andrews v. Florida*, forensic DNA technology has become a widespread and powerful tool.[40] As with most technology, demand began to increase for a faster and more convenient method of obtaining forensic DNA results.[41] In 2010, the FBI established a Rapid DNA Program Office to "facilitate the development and integration of Rapid DNA technology for use by law enforcement."[42] While the federal government has clearly encouraged the use of such technology, developers in the private sector have taken up the mantle of developing the technology necessary for Rapid DNA analysis.[43] IntegenX and ANDE are two major players in the development of this new technology.[44] This privatization marks a major shift in the way forensic technology is developed, as traditional DNA technology came about as a result of research done in the public sector, largely at the University of Leicester and United Kingdom Home Office Forensic Science Service.[45]

Like most traditional forensic DNA testing, Rapid DNA technology relies on the comparison of STRs at certain loci with STRs found in reference samples.[46] However, rather than entrust the necessary steps of isolating, quantifying, amplifying, and analyzing a given sample to a trained biologist in a forensics lab, Rapid DNA testing completely removes human input from the process.[47] A person inserts DNA samples into plastic cassettes, known as BioChipSet Cassettes, which contain all of the reagents needed

39. *Id*. at 400.

40. 533 So. 2d 841, 843 (Fla. Dist. Ct. App. 1988) (discussing the defendant's criminal conviction); Cino, *supra* note 15, at 378–79.

41. Cino, *supra* note 15, at 415.

42. *Rapid DNA*, FED. BUREAU OF INVESTIGATION, https://www.fbi.gov/services/laboratory/biometric-analysis/codis/rapid-dna (last visited Mar. 28, 2018) [hereinafter *Rapid DNA*].

43. *See* Augenstein, *supra* note 11; Cino, *supra* note 15, at 415, 417.

44. Annie Sciacca, *Rapid DNA Technology Gives Law Enforcement Access to Your DNA in 90 Minutes*, GOV'T TECH. MAG. (Aug. 28, 2017), http://www.govtech.com/public-safety/Rapid-DNA-Technology-Gives-Law-Enforcement-Access-to-Your-DNA-in-90-Minutes.html; *About*, ANDE, https://www.ande.com/about/ (last visited Mar. 28, 2018); INTEGENX, *supra* note 6.

45. *See* Hageman, *supra* note 16, at 382.

46. *Id.*; Cino, *supra* note 15, at 416–17.

47. *See* Cino, *supra* note 15, at 416.

for every step of the DNA analysis process, and then inserts the cassettes into a Rapid DNA machine.[48] When the machine is closed, the sample is not visible and the only input that lab technicians or analysts have in the process is through periodic interaction with click-through prompts on a touch screen monitor.[49] The Rapid DNA machine creates two data files, one that contains the raw data from DNA analysis and another described as "CODIS-compatible" that is formatted to enable automatic upload to DNA databanks.[50]

On August 18, 2017, the federal government took a major step toward inclusion of Rapid DNA technology as a federally recognized evidentiary technique by passing the Rapid DNA Act of 2017.[51] This law specifically amended the DNA Identification Act of 1994 by updating the requirements for federal forensic DNA standards and procedures to include Rapid DNA machines and by empowering the FBI to set such standards.[52] The Rapid DNA Act also clarified a very important difference in how traditional and Rapid DNA will be used by the criminal justice system; whereas the procedure of conducting traditional testing requires a lab environment and trained lab technicians and analysts, Rapid DNA technology is entirely automated and, thus, could theoretically be performed outside the lab setting.[53] The text of this law requires the FBI to draft and enforce standards for the use of Rapid DNA technology by "criminal justice agencies," which may mean that a future in which police officers and detectives can test a suspect's DNA at the precinct level is closer than ever before.[54]

### C. *A Potential Beneficiary of Rapid DNA: Virginia's Commitment to Clearing the PERK Backlog*

Over the past ten years, the nationwide outrage centered around the rape kit backlog has been growing. Rape kits, or PERKs, are

48. *Id.*

49. *Id.*

50. *Id.* at 417.

51. Rapid DNA Act of 2017, Pub. L. No. 115-50, 131 Stat. 1001 (to be codified in scattered sections of 42 U.S.C.).

52. *Id.* § 2(a), 131 Stat. at 1001 (to be codified at 42 U.S.C. § 14131(a)).

53. *Id.* § 3(a), 131 Stat. at 1001–1002 (to be codified at 42 U.S.C. § 14135(a)); *see* Cino, *supra* note 15, at 417–18.

54. Rapid DNA Act § 2, 131 Stat. at 1001 (to be codified at 42 U.S.C. §§ 14131(a), 14132(b)(2)).

essentially evidence kits containing key genetic and forensic evidence that is collected from the body of a sexual assault victim soon after the commission of a sex crime.[55] Like all DNA evidence, when tested, PERKs can serve as powerful tools in the identification and prosecution of assailants and can help ensure the prevention of future attacks by serial offenders.[56] However, in Virginia and many other states nationwide, thousands of PERKs have gone untested, forming what has come to be known as the rape kit backlog.[57] No concrete number of untested PERKs has ever been calculated, but 2015 estimates placed the national backlog somewhere between 100,000 and 400,000 untested PERKs.[58]

When activists, law enforcement personnel, and policymakers speak about the backlog, it is important to keep in mind that what seems like one problem can actually be divided into two distinct issues.[59] The first part of the backlog is composed of PERKs that "are collected and booked into evidence, but [for which] detectives and/or prosecutors do not request DNA analysis," which means the PERKS often spend indefinite lengths of time in police evidence storage facilities.[60] The second part of the backlog includes PERKs which "have been submitted for testing [but] are awaiting DNA analysis," having moved from police custody to federal or state crime labs to await processing.[61] According to Katya Herndon, Chief Deputy Director of the Virginia Department of Forensic Science, the backlog that built up in the Commonwealth between 1989 and 2015 was composed exclusively of PERKs that were simply never sent to the Department of Forensic Science for testing.[62]

The 2014 Virginia General Assembly took the first step toward alleviating this problem by passing Senate Bill 658, which specifically ordered "[a]ll local and state law-enforcement agencies [to] report an inventory of all physical evidence recovery kits in their

55. *See PERKs*, VA. DEP'T OF FORENSIC SCI., www.dfs.virginia.gov/field-test-kits/perks (last visited Mar. 28, 2018); *What Is the Rape Kit Backlog?*, END THE BACKLOG, http://www.endthebacklog.org/backlog/what-rape-kit-backlog (last visited Mar. 28, 2018).

56. *What Is the Rape Kit Backlog?*, *supra* note 55.

57. *Id.*; *see also* Weiner, *supra* note 12.

58. Abigail Tracy, *Rape Kit Backlog Grows Nationwide, Jeopardizing Prosecutions*, SCI. AM. (May 18, 2015), https://www.scientificamerican.com/article/rape-kit-backlog-grows-nationwide-jeopardizing-prosecutions/.

59. *See What Is the Rape Kit Backlog?*, *supra* note 55.

60. *Id*.

61. *Id*.

62. *See* Weiner, *supra* note 12.

custody that may contain biological evidence that were collected but not submitted to the Department of Forensic Science."[63] After collecting this information, the Department of Forensic Science put together a 2015 report, which calculated the statewide backlog at 2902 PERKs.[64] As part of their effort to begin testing these PERKs, Virginia was awarded a $1,399,989 grant through the New York County District Attorney's Office Sexual Assault Kit Backlog Elimination Program.[65] As of 2015, Virginia planned to fund the testing of any remaining kits through the National Institute of Justice and FBI Laboratory Sexual Assault Kit Partnership; this federal program is committed to testing a limited number of PERKs on a monthly basis in an effort to reduce the nationwide backlog.[66] However, in truth, neither of these options presents a long-term solution, and Virginia will need to find new methods to ensure that once this backlog is cleared, it never has the chance to accumulate again.

## II. ADMISSIBILITY OF DIAGNOSTIC TEST RESULTS

### A. *Federal Evidentiary DNA Admissibility Standards*

"For all generally accepted testing procedures, there was once a first instance when a judge made the decision to allow a specific type of scientific evidence to be presented at trial."[67] To understand how Rapid DNA technology will be used by the criminal justice system in the years to come, it is valuable to examine the evidentiary admissibility standards currently in place. While most states conform to the federal standards in regard to expert testimony, which encompass the inclusion of most DNA evidence, Virginia has its own unique standards of admissibility.[68] This part will begin with

63. Act of Apr. 4, 2014, ch. 642, 2014 Va. Acts 1084, 1084; *see also* VA. DEP'T OF FORENSIC SCI., PHYSICAL EVIDENCE RECOVERY KIT INVENTORY REPORT, S. 2014-13, Reg. Sess., at 2 (2015); Portnoy, *supra* note 14 (discussing the passage of the law).

64. VA. DEP'T OF FORENSIC SCI., PHYSICAL EVIDENCE RECOVERY KIT INVENTORY REPORT, S. 2014-13, Reg. Sess., at 13 (2015).

65. *See id.* at 11. The Virginia Department of Forensic Science Budget sought $1,404,729 in grant funding. *Id.*

66. *See id.*

67. NORAH RUDIN & KEITH INMAN, AN INTRODUCTION TO FORENSIC DNA ANALYSIS 183 (2d ed. 2002).

68. Michael Morgenstern, Daubert *v.* Frye—*a State-by-State Comparison*, EXPERT INST. (Apr. 3, 2017), https://www.theexpertinstitute.com/daubert-v-frye-a-state-by-state-comparison/.

a look at the *Frye v. United States*, *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, and statutory evidentiary standards used in the federal system as well as in most states nationwide.[69] It will also examine the particular standards used in Virginia.[70] Examination of these standards will permit analysis of the ways in which Rapid DNA technology may fit into this framework, and will anticipate some potential hurdles to admissibility. At the federal level, scientific evidence is governed by the intersection of three different admissibility standards, one derived from statute and the other two drawn from case law.[71]

1. *Frye v. United States* and Scientific "General Acceptance"

The first of these seminal cases, *Frye v. United States*, decided in 1923, required the Court of Appeals for the District of Columbia to determine the admissibility of a polygraph test.[72] The court ultimately found that the polygraph evidence was inadmissible due to what is now commonly referred to as the "general acceptance" test or the "*Frye* standard": "the thing from which the deduction is made must be sufficiently established to have gained *general acceptance* in the particular field in which it belongs."[73] This standard was the federal norm for decades and is still used with some modification and adaptation in many state jurisdictions.[74] These states have sought to provide greater clarification regarding who may testify as to the general acceptance of a given scientific technique, how that individual must be qualified to testify, and the subjectivity required in assessing the results of a given procedure.[75]

Given the fact that traditional DNA analysis is performed by trained lab technicians—experts in their field—it makes sense that these individuals would be called to testify in jurisdictions

69. *See* FED. R. EVID. 403, 702; Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579 (1993); Frye v. United States, 293 F. 1013 (D.C. Cir. 1923); Morgenstern, *supra* note 68 (stating that seventy-eight percent of states adopted the *Daubert* standard).

70. *See* VA. CODE ANN. § 19.2-270.5 (Repl. Vol. 2015); VA. SUP. CT. R. 2:703(a) (Repl. Vol. 2017 & Supp. 2017); R. 2:705(a) (Repl. Vol. 2017); R. 2:706(a) (Repl. Vol. 2017).

71. RUDIN & INMAN, *supra* note 67, at 183.

72. *Frye*, 293 F. at 1014; Carlton Bailey, *The Admissibility of "Novel Scientific Evidence" in Arkansas: Does* Frye *Matter?*, 52 ARK. L. REV. 671, 672 (1999).

73. *Frye*, 293 F. at 1014 (emphasis added); *see* RUDIN & INMAN, *supra* note 67, at 183.

74. *See* RUDIN & INMAN, *supra* note 67, at 183–84 ("Until recently, the majority of federal decisions relied on *Frye* and a majority of states had adopted various iterations of it, also incorporating their own additional requirements.").

75. *Id.* at 184.

governed by iterations of the *Frye* standard. However, one of the major advantages of Rapid DNA technology—that it does not require a technician to perform any part of the analysis—presents a clear admissibility problem. If the individuals collecting, testing, and ultimately uploading DNA results to CODIS are law enforcement personnel, it seems doubtful that they will be able to withstand qualification as an expert in the field of DNA sequencing and analysis. Since the federal Rapid DNA Act of 2017 empowered the FBI to set standards for the use of Rapid DNA technology at both the lab and precinct levels,[76] their training standards should provide details regarding the expertise of those who will be permitted to use this technology. Currently, however, the published requirements for the use of Rapid DNA technology at the precinct level only briefly mention the need for "authorized" users of the technology, and the requirement for "documented training" of those experts.[77] The vagueness of the current requirements may be due to the relatively recent development of this technology; since the Rapid DNA Act only passed in August of 2017, it is likely that these standards are still being drafted and revised by the FBI.[78]

The fact that Rapid DNA technology has only emerged in the last decade also necessarily leads to potential issues with the requirement that a given technology or type of analysis must have "gained general acceptance in the particular field in which it belongs."[79] Granted, since the emergence of this technology, there have been instances of peer review and publications in reputable

76. Rapid DNA Act of 2017, Pub. L. No. 115-50, § 2, 131 Stat. 1001, 1001 (to be codified at 42 U.S.C. §§ 14131(a), 14131(b)(2)); FED. BUREAU OF INVESTIGATION, REQUIREMENTS FOR RAPID DNA IN THE BOOKING ENVIRONMENT 2 (2017), https://www.fbi.gov/file-repository/rdna-requirements-9-20-17-final.pdf/view [hereinafter BOOKING REQUIREMENTS FOR RAPID DNA].

77. *See* BOOKING REQUIREMENTS FOR RAPID DNA, *supra* note 76; *Rapid DNA*, *supra* note 42.

78. *See* BOOKING REQUIREMENTS FOR RAPID DNA, *supra* note 76; *see, e.g.*, Susana Salceda et al., *Validation of a Rapid DNA Process with the RapidHIT ID System Using GlobalFiler Express Chemistry, a Platform Optimized for Decentralized Testing Environments*, 28 FORENSIC SCI. INT'L 21, 33 (2017) (indicating that "[o]verall, the RapidHIT ID shows highly reliable size precision" and "highly robust performance . . . over a wide range of operating conditions"); Lori K. Hennessy et al., *Developmental Validation of the GlobalFiler Express Kit, a 24-Marker STR Assay, on the RapidHIT System*, 13 FORENSIC SCI. INT'L 247, 257 (2014).

79. *See* Frye v. United States, 293 F. 1013, 1014 (1923).

scientific journals indicating that these Rapid DNA machines really may be capable of all that they promise.[80] However, this technology is still new, as exemplified by the fact that most peer review has only been published in the last five years, and it therefore seems premature to classify Rapid DNA technology as generally accepted within its respective field.[81] Ultimately, while the federal government may have accepted Rapid DNA technology with open arms, the *Frye* standard makes it unclear as to whether courts will be as accepting of Rapid DNA evidence as law enforcement and federal legislators.

### 2. Federal Rules of Evidence and the Discretion of the Court

The 1975 adoption of the Federal Rules of Evidence, which seemed to loosen the *Frye* standard, "relegate[d] a wide breadth of discretion to the court," further complicating the landscape of federal admissibility standards.[82] Rules 403 and 702 are most relevant to the admission of scientific evidence.[83] Rule 403 specifically puts the power to exclude evidence in the hands of the court, stating that the court may prevent relevant evidence from reaching the jury if "its probative value is substantially outweighed by a danger of . . . unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence."[84] Rule 702 attempts to provide the guidelines necessary for the determination and certification of a witness as an expert "by knowledge, skill, experience, training, or education."[85]

While the information gleaned through Rapid DNA analysis is undoubtedly probative evidence, there is some question under Rule 403 as to the prejudice implicated by a police officer taking the stand to testify as to the results of such testing. Unlike a scientific

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80. *See* Salceda et al., *supra* note 78, at 33 (indicating that "multiple RapidHIT ID systems networked with RapidLINK software form a highly reliable system for wide-scale deployment in locations such as police booking stations").

81. *See, e.g.*, Hennessy et al., *supra* note 78, at 257; Mitchell Holland & Frank Wendt, *Evaluation of the RapidHIT 200, an Automated Human Identification System for STR Analysis of Single Source Samples*, 14 FORENSIC SCI. INT'L 76, 84 (2015); Bobby L. LaRue et al., *An Evaluation of the RapidHIT System for Reliably Genotyping Reference Samples*, 13 FORENSIC SCI. INT'L 104, 110 (2014).

82. RUDIN & INMAN, *supra* note 67, at 185; *see* Act of Jan. 2, 1975, Pub. L. No. 93-595, 88 Stat. 1926 (enacting the Federal Rules of Evidence).

83. FED. R. EVID. 403, 702; RUDIN & INMAN, *supra* note 67, at 185.

84. FED. R. EVID. 403.

85. FED. R. EVID. 702.

expert, who is supposed to be a neutral party even when employed by a state or federal lab, a police officer who has performed this testing has a clear bias as to the outcome of said test. This scenario, when combined with the general trust or distrust that members of the jury may have for members of law enforcement, creates a potentially prejudicial situation. Rule 702 also presents an issue for law enforcement officers who act as Rapid DNA technicians at the precinct level seeking to take the stand; regardless of the Rapid DNA training that may be offered to law enforcement officers, the fact that they are not inherently experts in this field may lead to their inability to testify as experts. Granted, the prosecution would likely find scientists who would be able to fully explain the science behind these techniques. However, the individual performing the test will likely only qualify as a factual witness, leading to serious limitations as to the breadth of their testimony.

### 3. *Daubert v. Merrell Dow Pharmaceuticals, Inc.*: A New Set of Factors

By the early 1990s, federal admissibility standards for scientific evidence were a confusing combination of the decades-old *Frye* standard overlain with the relatively new Federal Rules of Evidence.[86] In 1993, the Supreme Court's ruling in *Daubert v. Merrell Dow Pharmaceuticals, Inc.* settled this conflict in favor of placing greater discretion in the hands of trial court judges, who would serve a "gatekeeping role" for the admission of scientific evidence.[87] The Court held that the general acceptance standard of *Frye* was no longer "a necessary precondition to the admissibility of scientific evidence," and that the Federal Rules of Evidence allowed the judge great discretion in determining which scientific evidence should go to the jury.[88] Rather than leaving the trial judges with complete discretion, *Daubert* also laid out a set of guidelines for courts to consider when determining admissibility: (1) "whether a theory or technique is scientific knowledge" that "can be (and has been) tested"; (2) "whether the theory or technique has been subjected to peer review and publication"; (3) "the known or potential rate of error . . . and the existence and maintenance of standards controlling the technique's operation"; and (4) whether the theory

86. *See* RUDIN & INMAN, *supra* note 67, at 184–85.
87. 509 U.S. 579, 597 (1993).
88. RUDIN & INMAN, *supra* note 67, at 185; *see Daubert*, 509 U.S. at 593–94.

or technique has attracted "widespread acceptance" within the scientific community.[89]

More than twenty years later, the "*Daubert* standard" is not only the most current admissibility standard for federal scientific evidence, but is also the most widely used standard by state jurisdictions nationwide.[90] Therefore, the difficulty fitting Rapid DNA technology into this established evidentiary framework has far-reaching implications for the criminal justice system. Judges will undoubtedly differ in their decisions regarding the admissibility of data analyzed using this new technique, but, as with the standards of *Frye* and the Federal Rules of Evidence, the fact that Rapid DNA technology has only emerged within the last decade will likely be a red flag to courts. The amount of judicial discretion in determining the admissibility of scientific evidence necessarily leads to concerns over whether judges are qualified to make these kinds of determinations. After all, most judges are not trained in the scientific or technical fields implicated by this kind of expert testimony, and therefore may not fully understand the ramifications and requirements of the peer review process.

In *Daubert*, Chief Justice William H. Rehnquist first raised concerns over the type of knowledge required of these gatekeeping federal judges.[91] These concerns are highly relevant in the context of Rapid DNA technology. Chief Justice Rehnquist took major issue with the majority's holding that the "'key question' to be answered in deciding whether something is 'scientific knowledge' 'will be whether it can be (and has been) tested.'"[92] He highlighted that this essentially gives federal judges the "obligation or the authority to become amateur scientists" to make their gatekeeping determination regarding admissibility of scientific expert testimony.[93] Rapid DNA technology has been developed, and thus largely explained, by the private sector; consequently, judges seeking to educate themselves as to the standards and uses of this technology before performing their gatekeeping role will likely encounter information promulgated by those with a financial stake in the criminal justice system's acceptance of this technology. Although there

89. *Daubert*, 509 U.S. at 593–94; *see* RUDIN & INMAN, *supra* note 67, at 185.

90. *See* Morgenstern, *supra* note 68.

91. *Daubert*, 509 U.S. at 600 (Rehnquist, C.J., concurring in part, dissenting in part, and concurring in the judgment).

92. *Id.* (quoting *id.* at 593 (majority opinion)).

93. *Id.* at 600–01.

is some unbiased peer review of the various Rapid DNA sequencing machines on the market, much of this literature will not be readily understood by laymen.[94]

## B. *Virginia's Evidentiary Standards*

While most state jurisdictions have adopted some combination of the *Frye*, *Daubert*, and Federal Rules of Evidence standards for admissibility of scientific evidence, Virginia is one of three states to craft its own unique standard.[95] In Virginia, the standard for expert testimony is rather low, and "[t]he facts, circumstances or data relied upon by such witness in forming an opinion or drawing inferences, if of a type normally relied upon by others in the particular field of expertise in forming opinions and drawing inferences, need not be admissible in evidence."[96] Virginia has also codified a provision which specifically addresses the admission of DNA evidence to establish the identity of any person. This provision states that "[i]n any criminal proceeding, DNA (deoxyribonucleic acid) testing shall be deemed to be a reliable scientific technique and the evidence of a DNA profile comparison may be admitted to prove or disprove the identity of any person."[97]

Taken together, these codified provisions indicate that when Rapid DNA technology comes to Virginia, it will likely be met with open arms. Not unlike the federal *Daubert* standard, Virginia still requires that expert testimony on the topic of the Rapid DNA sequencing technique be consistent with the processes used by others in this field.[98] But this hurdle seems considerably lower than the peer review and potential error rate issues that federal judges may raise in their *Daubert* gatekeeping role. Additionally, in Virginia, DNA evidence is assumed to be admissible evidence with no specific instructions regarding different techniques or technologies that may be used to generate the same results.[99] In fact, Virginia

94. *See, e.g.*, Hennessy et al., *supra* note 78, at 247; Holland & Wendt, *supra* note 81, at 104; LaRue et al., *supra* note 81, at 104; Salceda et al., *supra* note 78, at 21; *see supra* notes 80–81 and accompanying text.

95. *See* Morgenstern, *supra* note 68 (revealing that only Virginia, Nevada, and North Dakota have refused to adopt some version of the federal standard).

96. *See* VA. SUP. CT. R. 2:703(a) (Repl. Vol. 2017 & Cum. Supp. 2017); R. 2:705(a) (Repl. Vol. 2017); R. 2:706(a) (Repl. Vol. 2017).

97. VA. CODE ANN. § 19.2-270.5 (Repl. Vol. 2015).

98. R. 2:703(a) (Repl. Vol. 2017 & Cum. Supp. 2017); R. 2:705(a) (Repl. Vol. 2017); R. 2:706(a) (Repl. Vol. 2017).

99. VA. CODE ANN. § 19.2-270.5.

courts "shall not otherwise limit the introduction of any relevant evidence bearing upon any question at issue before the court, including the accuracy and reliability of the procedures employed in the collection and analysis of a particular DNA sample."[100] In Virginia, the jury—not the judge—is responsible for assigning weight to DNA evidence presented at trial.

While perhaps more consistent with the general democratic ideal of placing discretion over the admissibility of scientific evidence in the hands of a jury, Virginia's standard is still concerning. It is difficult enough to imagine a judge being capable of determining the appropriate weight to give specialized scientific evidence. In the hands of lay jurors, who are also likely untrained in the sciences and are far more susceptible than judges to the theatrics of the courtroom, DNA evidence generated using a completely novel sequencing method could lead to deeply unsettling outcomes. If Virginia follows the example set by Arizona, Florida, South Carolina, and Pennsylvania by using Rapid DNA technology at both the laboratory and precinct levels, the Virginia General Assembly should critically consider the level of discretionary power it is comfortable leaving in the hands of the jury.[101]

## III. ADMISSIBILITY IMPLICATIONS OF RAPID DNA TECHNOLOGY

### A. *Ethical Considerations*

While it is important to consider how admissibility standards will shape the future use of Rapid DNA technology, it is also crucial to acknowledge the ethical implications of this technology. The admissibility of DNA evidence in the early days was largely undisputed, but there has recently been increased pushback from defense attorneys.[102] After all, DNA sequencing of any kind—never mind Rapid DNA sequencing, which is currently in its infancy—is still rather new to the criminal justice system.[103] A major ethical consideration is the host of privacy issues that stem from the collection and retention of DNA evidence in government databanks

100. *Id.*

101. *See* Steward, *supra* note 7, at 1143.

102. Lisa Calandro et al., *Evolution of DNA Evidence for Crime Solving—a Judicial and Legislative History*, FORENSIC MAG. (Jan. 6, 2005, 3:00 AM), https://www.forensicmag.com/article/2005/01/evolution-dna-evidence-crime-solving-judicial-and-legislative-history.

103. *Id.*

like CODIS: when should collection of this information be permitted, how long and by whom should it be stored, and when should it be accessed? Jurisdictions, such as Virginia, who want to use Rapid DNA technology will also need to address the significant ethical implications of removing human analysts from the processing of DNA evidence. Neither of these ethical concerns should necessarily lead to a complete bar of this technology, but each should inform the policies that will accompany the rollout of Rapid DNA technology nationwide.

The premise behind, and the rise of, DNA databanks can be largely understood through the sociological phenomenon that "[v]iolent offenders will continue to commit crimes until caught."[104] Because the perpetrators of these crimes inevitably leave physical evidence behind at crime scenes, both federal and state governments, in the age of DNA sequencing, have approved and funded the creation of DNA databanks to store this data for comparison to samples collected at future crime scenes.[105] The federal DNA Identification Act of 1994 mandated the creation of CODIS, and today, "[a]ll DNA laboratories that are federally operated, receive federal funds, or employ software prepared for the CODIS are required to demonstrate compliance with the standards issued by the FBI."[106] The passage of the Rapid DNA Act of 2017 amended the DNA Identification Act of 1994 by expanding the purview of the FBI to recommend guidelines for both precincts and labs using CODIS in conjunction with both traditional and Rapid DNA sequencing technology.[107]

Currently, the FBI is "working with the Scientific Working Group for DNA Analysis Methods . . . to develop standards and procedures for the FBI approval and operation of the Rapid DNA systems."[108] Therefore, without established standards, precincts that rely on CODIS have not yet been able to implement Rapid DNA technology.[109] However, the FBI will eventually draft and finalize guidelines to be implemented nationwide by labs and law

104. RUDIN & INMAN, *supra* note 67, at 157.

105. *See id.*

106. DNA Identification Act of 1994, Pub. L. No. 103-322, § 210304, 108 Stat. 2065, 2069 (codified at 42 U.S.C. § 14132 (2012)); Calandro et al., *supra* note 102.

107. *See* Rapid DNA Act of 2017, Pub. L. No. 115-50, § 2–3, 131 Stat. 1001, 1001–02 (to be codified at 42 U.S.C. §§ 14131(a), 14132(b)(2), 14135a, 14135b).

108. *Rapid DNA*, *supra* note 42.

109. *Id.*

enforcement agencies looking to utilize this powerful new technology. Thus far, the FBI has established prerequisites for jurisdictions hoping to use CODIS in conjunction with Rapid DNA sequencing.[110] "[F]ederal, state and local booking agencies . . . must . . . implement[] an Arrestee DNA collection law that authorizes DNA analysis at the time of arrest," and have "Electronic Fingerprint (Live Scan) integration during the booking process."[111] Booking agencies must "have network connectivity with the State Identification Bureau."[112]

Regardless of when these standards are set, it is impossible to imagine that there will not be pushback over the ways in which this technology will expand the amount of data found in CODIS. The capability of DNA collection upon arrest, at the front end of a criminal prosecution, is arguably one of the more revolutionary advantages of Rapid DNA technology; however, this capacity has already led to privacy concerns from organizations such as the American Civil Liberties Union ("ACLU").[113] The creation of a "growing database of DNA profiles for reference" leads to concerns about possible constitutional invasions of privacy.[114] The passage of the Rapid DNA Act of 2017 also means that law enforcement officers will no longer have to use a lab to upload genetic profiles to CODIS, but will be able to directly upload new profiles to the databank using nothing more than their precinct's Rapid DNA sequencing machines.[115]

Virginia has long been at the forefront of the implementation of DNA technology in the criminal justice system, and the Virginia Department of Forensic Science was the first in the nation to adopt these policies.[116] In 1989, the Virginia General Assembly was also "the first American legislature to pass laws that required certain classes of offenders to submit DNA samples for inclusion in a DNA

110. *Id.*

111. *Id.*

112. *Id.*

113. Steward, *supra* note 7, at 1148.

114. *Id.*

115. *See* Shane Bauer, *The FBI Is Very Excited About This Machine That Can Scan Your DNA in 90 Minutes*, MOTHER JONES (Nov. 20, 2014, 11:30 AM), http://www.motherjones.com/politics/2014/11/rapid-dna-profiles-database-fbi-police/.

116. Michelle Hibbert, *DNA Databanks: Law Enforcement's Greatest Surveillance Tool?*, 34 WAKE FOREST L. REV. 767, 774–75 (1999) ("Within nine years of Virginia's establishment of the first state DNA databank, the other forty-nine states passed laws requiring the collection of DNA samples from certain criminals for the purposes of establishing state DNA databanks.").

databank."[117] The Commonwealth mandates the collection of DNA from individuals convicted of felonies "on or after July 1, 1990," those convicted of felonies "under Article 7 . . . of Chapter 4 of Title 18.2 who [were] incarcerated on July 1, 1989," and all those convicted of certain misdemeanors.[118] In predicting how the Commonwealth will react to the adoption of Rapid DNA technology, it is important to consider that Virginia enacted an arrestee DNA collection law of the type that the FBI has established as a prerequisite for the use of this new technology.[119] The law mandates the collection of a saliva or tissue sample from "[e]very person arrested for the commission or attempted commission of a violent felony."[120] This may realistically encompass only a small percentage of those arrested in the Commonwealth,[121] but the fact that this framework is already in place—especially considering Virginia's general willingness to adopt new DNA technology in the criminal context—is concerning.

### B. *Scientific Considerations*

Beyond the sticky ethical implications of collecting, sequencing, and reporting large quantities of DNA before convictions have been obtained, Rapid DNA technology is also ethically fraught in its scientific procedure. Despite the ways in which this technology has been touted as a "silver bullet" which will obliterate the rape kit backlog, the technology is not yet capable of "discern[ing] individual DNA in commingled bodily fluids."[122] Until Rapid DNA technology is improved, it will be virtually useless in processing rape kits.[123] Because of this major limitation, the FBI has also made it clear that "[f]or [the] purposes of uploading or searching CODIS,

117. *Id.* at 774.

118. Act of Apr. 7, 2002, ch. 753, 2002 Va. Acts 1258, 1258 (codified as amended at VA. CODE ANN. § 19.2-310.2 (Repl. Vol. 2015)); Act of Apr. 7, 2002, ch. 773, 2002 Va. Acts 1286, 1286 (codified as amended at VA. CODE ANN. § 19.2-310.2 (Repl. Vol. 2015)).

119. Act of Apr. 7, 2002, ch. 753, 2002 Va. Acts 1258, 1258 (codified at VA. CODE ANN. § 19.2-310.2:1 (Repl. Vol. 2015)); Act of Apr. 7, 2002, ch. 773, 2002 Va. Acts 1286, 1286 (codified at VA. CODE ANN. § 19.2-310.2:1 (Repl. Vol. 2015)).

120. VA. CODE ANN. § 19.2-310.2:1.

121. *See* VA. DEP'T OF STATE POLICE, CRIME IN VIRGINIA 2016, at 45, 69–71 (reporting that 8261 of the 248,263 total arrests in 2016 were for violent felonies).

122. *See* Bauer, *supra* note 115.

123. *See id.*

Rapid DNA systems are not authorized for use on crime scene samples."[124] Removing both of these possible applications, Rapid DNA technology will be most useful in the most controversial of contexts—the collection and automatic upload of arrestee DNA profiles to CODIS and state databanks.

Even putting aside the scientific limitations of such "a major technological leap," and assuming that Rapid DNA technology will eventually be able to process comingled samples, the major ethical problem of automation still exists.[125] While this new, convenient, and cost-effective method of automated DNA sequencing may seem like the inevitable next step, caution should be exercised in deciding to do away with human involvement in this process. Progress for the sake of progress should be viewed skeptically, and we should bear in mind that:

> The trend toward automation carries a danger. As robots and computers take over the mundane tasks of DNA typing, it is tempting to allow the reproducibility of the non-human aspect to usurp the importance of trained judgement in the evaluation of results and rendering of opinions. Regardless of the evermore technical evolution of the field, there will always be the need for a person to sit in front of a jury and say in plain English what was done and what the results mean in that particular case.[126]

As previously discussed, this push towards automation will also lead to admissibility issues with the testimony of expert witnesses, as expert testimony is the most common method of introducing and admitting DNA evidence in court.[127] When a robot is performing every necessary part of a scientific procedure, including the side-by-side analysis with a databank, who can take the stand?

## CONCLUSION AND RECOMMENDATION

Considering the recent push to clear the PERK backlog, Virginia and other state legislatures will likely be tempted to rush into adopting the kind of laws and standards which would allow for the introduction of Rapid DNA testing at both the precinct and the lab. Despite the distinct advantages of reduced costs, wait times, and

124. *Rapid DNA*, *supra* note 42.
125. Bauer, *supra* note 115; *see* RUDIN & INMAN, *supra* note 67, at 90.
126. RUDIN & INMAN, *supra* note 67, at 90.
127. *See supra* Part II.

need for personnel, this new technology still faces an uncertain ethical, legal, and scientific future. While faster DNA testing may be the future of this industry, Virginia and the nation as a whole should be cautious about rushing to adopt a technology which has not yet been fully accredited and could cause a rapid expansion of DNA databanks nationwide.

Considering the resulting consequences for those whose DNA is sequenced and added to any number of state databanks (as well as CODIS federally), perhaps the best way to proceed is to use Rapid DNA technology in conjunction with human oversight. At the lab level, the FBI has already stated that Rapid DNA equipment must be operated by "[q]ualified analyst[s] or trained laboratory personnel."[128] This would arguably resolve the potential qualification and admissibility problem with expert testimony at trial, and would add credibility to the results of this relatively new technology on the stand. Human involvement with Rapid DNA technology would also likely eliminate the ethical concerns with placing this technology in the hands of the very law enforcement officers who are working to build a case against a suspect.

Rapid DNA technology seems to be neither a miraculous scientific solution to the systemic problems plaguing law enforcement, nor a wholly unethical, Orwellian technology. As with most scientific innovations, the technology's utility and future ethical standing seem to be firmly dependent on the procedures implemented to guide the technology's use in a criminal setting. While it may be cheaper and more convenient to place Rapid DNA machines in a police precinct, it would undoubtedly be more ethically, legally, and scientifically sound to leave this new technology in the hands of qualified analysts. Both federal and statewide admissibility standards place an undue expectation of expertise on either the judge or the jury concerning the validity of scientific data;[129] the least that can be done is to ensure that sensitive DNA data is accurately generated. As the science now stands, Rapid DNA technology likely will not be able to eliminate the rape kit backlog, despite countless public relations attempts to assert the contrary.[130] However, it may

128. *Rapid DNA*, *supra* note 42.

129. *See* David L. Faigman, *Mapping the Labyrinth of Scientific Evidence*, 46 HASTINGS L.J. 555, 557–58 (1995).

130. *See, e.g.*, *Media Coverage*, INTEGENX, https://integenx.com/media-coverage/ (last visited Mar. 28, 2018); *The Rape Catastrophe in the U.S.*, ANDE, https://www.ande.com/sexual-assault/ (last visited Mar. 28, 2018).

still help advance the field of forensic DNA sequencing to an unprecedented level of convenience and affordability. The truth is that it is far too soon to know precisely whether this technology will be used for the betterment of society or the destruction of our civil liberties. But it is abundantly clear that this moment in history will be remembered as the last opportunity to take a hard look at the policies and requirements that should be implemented to guide Rapid DNA technology into the former category.

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